

What is claimed is:

1. A medical device, comprising:

an elongate catheter shaft, the shaft including an inner tubular member having an inner lumen extending therethrough, an outer tubular member, and an inflation lumen disposed between the inner tubular member and the outer tubular member;

wherein the outer tubular member includes a plurality of distal openings;

a balloon coupled to the shaft and disposed over the distal openings in the outer tubular member; and

one or more cutting members coupled to the balloon.

2. The medical device of claim 1, wherein the plurality of distal openings are

arranged about the outer tubular member in one or more longitudinally aligned sets.

3. The medical device of claim 2, wherein the one or more cutting members

are radially aligned with the longitudinally aligned sets.

4. The medical device of claim 1, wherein the inner tubular member extends

distally beyond a distal end of the outer tubular member.

5. The medical device of claim 1, wherein a distal end of the inner tubular

member and a distal end of the outer tubular member are substantially aligned.

6. An angioplasty balloon catheter, comprising:
 - a catheter shaft having an inflation lumen extending at least partially therethrough;
 - a first set of longitudinally aligned openings defined in the shaft;
 - a second set of longitudinally aligned openings defined in the shaft;
 - a balloon coupled to the shaft and disposed over the sets of openings, the balloon including an inner chamber in fluid communication with the inflation lumen;
 - a first cutting member coupled to the balloon and radially aligned with the first set of longitudinally aligned openings; and
 - a second cutting member coupled to the balloon and radially aligned with the second set of longitudinally aligned openings.
7. The catheter of claim 6, wherein the shaft includes an inner tubular member and an outer tubular member, and wherein the inflation lumen is defined by a space between the inner and outer tubular members.
8. The catheter of claim 7, wherein the inner tubular member extends distally beyond a distal end of the outer tubular member.
9. The catheter of claim 7, wherein a distal end of the inner tubular member and a distal end of the outer tubular member are substantially aligned.

10. The catheter of claim 7, wherein the catheter shaft includes a central guidewire lumen, and wherein the inflation lumen is disposed in the catheter shaft and positioned radially from the guidewire lumen.

11. The catheter of claim 10, further comprising a second inflation lumen disposed in the catheter shaft and positioned radially from the guidewire lumen.

12. The catheter of claim 11, wherein the inflation lumen is in fluid communication with the first set of longitudinally aligned slots and wherein the second inflation lumen is in fluid communication with the second set of longitudinally aligned slots.

13. The catheter of claim 12, further comprising one or more inflation lumens disposed in the catheter shaft.

14. A cutting balloon catheter, comprising:
an elongate shaft having a proximal end, a distal end, and a guidewire lumen extending therethrough;
a first side lumen defined in the shaft and extending therethrough;
a first longitudinally-aligned set of openings defined in the shaft and in fluid communication with the first side lumen;
a second side lumen defined in the shaft and extending therethrough;

a second longitudinally-aligned set of openings defined in the shaft and in fluid communication with the second side lumen;

a balloon coupled to the shaft and disposed over the first and second sets of openings; and

a cutting member coupled to the balloon.

15. The catheter of claim 14, wherein first set of openings includes three or more openings.

16. The catheter of claim 14, wherein the first side lumen has a half-moon shaped cross-sectional area.

17. The catheter of claim 14, wherein the first side lumen has a pill shaped cross-sectional area.

18. The catheter of claim 14, further comprising one or more additional side lumens.

19. The catheter of claim 14, wherein the first set of openings is radially aligned with the cutting member.

20. The catheter of claim 19, further comprising a second cutting member that is attached to the balloon and that is radially aligned with the second set of openings.

21. A cutting balloon catheter, comprising:
 - a multi-lumen catheter shaft having a proximal end, a distal end, a central guidewire lumen extending therethrough, and a plurality of side lumens extending at least partially therethrough;
 - a first set of openings defined in the shaft and in fluid communication with one of the plurality of side lumens;
 - a second set of openings defined in the shaft and in fluid communication with another one of the plurality of side lumens;
 - a balloon coupled to the shaft and disposed over the first and second sets of openings; and
 - a cutting member coupled to the balloon.
22. The catheter of claim 21, wherein first set of openings includes three or more openings.
23. The catheter of claim 21, wherein the side lumens have a half-moon shaped cross-sectional area.
24. The catheter of claim 21, wherein the side lumens have a pill shaped cross-sectional area.
25. The catheter of claim 21, wherein the catheter shaft includes four side lumens.

26. The catheter of claim 21, wherein the first set of openings is radially aligned with the cutting member.

27. The catheter of claim 26, further comprising a second cutting member that is attached to the balloon and that is radially aligned with the second set of openings.